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Grain Marketing Development in Third World Countries

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Introduction

Developed and developed country governments as well as international donors recognize the importance of grain marketing in the economic and social development of third world countries. In these countries, grains account for a major part of farm income and consumer food expenditures. In addition, grain marketing typically includes a large number of producers, consumers and intermediaries who are economically and politically powerful. Improvements in grain marketing that reduce food costs or improve farm income can accelerate the economic and social development of third world countries. For these reasons, identification of ways for third world countries and international donors to improve grain marketing merits further investigation.

The general objective of this paper is to help AID S&T/RD develop a program of research and technical assistance activities in the area of grain marketing to promote agricultural development in third world countries. The specific objectives are to: (1) describe the major changes in grain production, consumption, and marketing in third world countries; (2) trace the evolution of grain marketing systems using a temporal and cross section approach; (3) analyze the main factors contributing to change in the grain marketing system; and (4) identify future research and technical assistance needs in grain marketing.

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The analytical approach selected is that of a food system which includes the crop and livestock sectors of the economy. The participants in the food system that produce, transform and distribute agricultural products and inputs include input producers, input suppliers, agricultural producers, domestic traders, importers and exporters, processors, wholesalers, retailers, institutional buyers and consumers. One may look at the food system in a horizontal dimension by analyzing firms at a particular stage that perform a similar set of functions such as rice millers. One may also look at the food system in its vertical dimension as a commodity subsystem such as grains that cuts across all the different functions of the system from producer to consumer. These functions include input distribution, farm production, assembly, storage, transport, processing, wholesaling and retailing. The vertical subsystem for grains is the main focus of the present report.

For purposes of this report grains are defined to include rice, wheat, corn, sorghum, millet, barley and oats. Grain marketing developments during the last twenty years are emphasized because it is a period of rapid change in grain markets, it is consistent with the objectives of the paper, and it is the time period that the author knows best. Whenever possible research results and secondary data are used to document the changes in grain markets since the mid-1960s. In addition, the personal experiences of the author in some 35 developing countries during the last twenty years are an integral part of this study of grain markets in developing countries.

The next section of this report examines changes in grain production and consumption in the world during the last twenty years. The emphasis is on developing countries, but one cannot separate what happens in developing countries from the rest of the world when studying a widely traded commodity such as grains. The following section analyzes the changes in grain market organization and performance and the evolution of grain marketing systems. The factors contributing to change in the grain marketing system of third world countries are evaluated in Section IV. A program of applied research needs and technical assistance in grain marketing are identified in the concluding section.

Changes in Grain Production and Consumption

Changes in Grain Production

World grain production has increased at a fairly steady rate since the mid-1960s, so that production has generally kept pace with utilization. In some years (most recently 1983-84) production has failed to keep pace with consumption because of poor crops in some major producing countries such as the U.S. and Canada. World grain stocks reached a low of only 11.6 percent of utilization in that year but have increased very rapidly in recent years so that grain stocks are currently at very high levels (Table 1). Despite abundant global food supplies, there have been severe shortages in a number of developing countries of Africa because of drought, government policies and political instability. Food shortages are likely to continue to be a problem on at least a periodic basis for many African countries despite some recent efforts to solve the problem.

World grain production has increased faster than world population growth rates and is the main reason for the increasing world grain stocks in recent years. The production ard utilization imbalance is most severe in the developed countries because of low population growth rates (less than one percent annually compared to over two percent annually in the developing countries) and stagnating economies. Grain production has increased steadily in the developed countries in the last twenty years and is now about 1800 pounds per capita annually. In the same period, grain production in developing countries has remained practically unchanged at about 400 pounds per capita annually. In Africa, grain production per capita has declined slightly during the last twenty years and also shows a great deal of variability from year to year, whereas in Asia and Latin America, grain production per capita has increased slightly and is much less variable from year to year. Because of this production uncertainty, grain marketing systems and government policy in Africa may have to be very different from those in South America and Asia. A very effective grain importing system is essential in those countries with highly variable grain production from year to year.

The two grain production success stories of the last twenty years are India and China which have changed from net grain importers to net grain exporters. In India and China, this has been accomplished through the introduction of higher yielding cereal varieties, increased use of fertilizer and irrigation. In addition to those technical factors, China also changed its government policy toward the agricultural sector so that workers now have monetary incentives to expand production. The European

Community has also become a net exporter in recent years in large part because of the high internal price support system that has been established for EC farmers who produce grain and other commodities.

When one looks at world grain production in terms of wheat, coarse grains and rice, the production and utilization picture changes quite dramatically among the three grains. World wheat production has been growing faster than utilization for the last several years so that stocks as a percent of utilization are approaching 25 percent, the highest level in many years (Table 2). A similar situation exists for world coarse grain (corn, sorghum, barley, and oats) production which has increased much more rapidly than utilization in recent years. Stocks as a percent of utilization are near the 25 percent level and are expected to increase even further because utilization is only growing at about three percent annually, much less than the growth rate of production (Table 3). Only in rice is the rate of growth of production nearly in balance with the 3.3 percent average growth rate of utilization so that stocks have increased slightly to about 7 percent of world utilization. However, it should be noted that the rice stocks of North Korea, Laos, Vietnam, and China are not included and that these countries produce nearly 60 percent of the world's rice crop (Table 4).

The world supply-demand imbalance that causes the increasing world stocks is concentrated in wheat and coarse grains rather than rice and is mainly a problem of large crops in developed countries rather than developing countries. Rice is relatively more important in the developing countries of the world. Good weather in combination with high support prices and subsidies in the developed countries (EC and US) are the most important reasons for the surplus wheat and coarse grain production.

The increases in world grain production have led to many changes in the structure of farming in developing countries during the last twenty years. With the introduction of higher yielding varieties plus modern inputs and irrigation, farms have become more specialized in the production of a few commodities rather than the diversified, wider range of commodities produced in the past. This is particularly true in countries such as Taiwan, India, Brazil and Colombia where farmers have adopted the "Green Revolution" technologies. In many other countries, particularly in Africa, farming has changed very little in the last twenty years and continues at a subsistence level with only small surpluses above family consumption needs to market. Increased specialization means that the marketed quantity from each farm has increased even faster than grain production so that the marketing system has had to grow rapidly to handle increasing amounts of grain. As a result of the increased production and specialization, farmers are more dependent on the market place to purchase their output and supply their inputs. Because of this increased dependence, the economic consequences for producers of a marketing system that fails to provide the appropriate marketing services in a satisfactory manner are more severe.

Income to grain farmers has probably increased in the 1970s because of higher grain prices and yields in most countries of the world. The favorable prices attracted more farmers and more land to grain production and farmers increased their use of modern inputs such as fertilizers and improved seeds. From the use of these modern inputs, world rice yields have increased about 62 percent, wheat yields about 85 percent, and coarse grains about 70 percent since 1961. World yields are currently about 2.1 metric tons per hectare for wheat and coarse grains and 3.1 metric tons per hectare for rice. World wheat and rice yields have increased more rapidly

than coarse grain yields because of the rapid adoption of higher yielding hybrid varieties, increased use of fertilizer, expanded areas under irrigation and improved farm management practices (Wisner and Nourbakhsh). Millet yields, however, have remained essentially unchanged in this same time period and millet is the food crop of many of the poorest and most vulnerable farm families in Africa.

The above factors may have contributed to a dualistic structure in farming with an increasing number of large, commercial farms producing large quantities for market and a continuing substantial number of small farms producing mainly for home consumption with a small surplus to sell in the market. The small subsistence farms tend to rely on traditional varieties with little use of modern inputs and low yields. This dualistic structure appears to be most common in several countries of Latin America (Bolivia, Brazil, Colombia, and Ecuador) and less common in Africa and Asia (Taiwan and Korea), because of a more evenly distributed land ownership pattern. The existence of this dualistic structure and the implications for grain marketing in third world countries deserves more research attention.

Changes in Grain Consumption

World demand for grains has increased at a moderate rate in the early 1980s because of a world recession in which world grain utilization increased only slightly faster than the world's population growth rate. Changing population growth rates and growing per capita incomes are the main factors influencing the demand for grains in the diet. High population growth rates (near 2.5 percent annually in many developing countries)

create an expanding market for grains; however, as development occurs these population growth rates will decline to much lower levels and slow this source of demand for grain.

Because corn has a lower price relative to other cereals, corn has a wider range of uses than other cereals such as rice and wheat. Corn is used for direct human consumption, industrial processed foods, industrial non-food products such as starches, livestock feed and most recently for ethanol production to blend with gasoline. Corn for direct human consumption is largely concentrated in the developing countries where per capita consumption is about twenty kilograms annually. The per capita consumption of corn for human food is substantially less than that for wheat and rice, about 45 and 82 kilograms per capita annually, respectively. Per capita consumption of corn as a human food is very high in a few developing countries such as Mexico, Guatemala, Honduras, Kenya, Malawi, Zambia and Zimbabwe where the per capita human consumption is about 100 kilograms annually. In several other African countries, the per capita consumption of corn direct for human food is about 40 kilograms annually (CIMMYT).

Worldwide, about 65 percent of corn use is for animal feed and 27 percent is for human food and the rest is for other uses. The proportion of corn used for livestock feed increases rapidly with per capita income. In developed market economies, per capita corn use is over 200 kilograms annually, with about 80 percent of the use as a livestock feed. For example, in the U.S. per capita corn use equals about 480 kilograms annually with about 430 kilograms of that amount for livestock use. For countries below US$300 per capita GNP, the percentage of corn for livestock feed is small; however, the proportion increases rapidly for countries with per capita GNP above US$650, and is over 80 percent for most high income

countries (GNP per capita of US$6,000). Thus, demand for corn as a livestock feed can be expected to increase rapidly as incomes grow in the middle income countries and can lead to major changes in the grain marketing system as livestock feeding, feeds and processing become more important.

Growing per capita incomes are the most dynamic factor influencing the demand for grain through changing consumption patterns for grains and meat. As incomes grow, consumers increase the proportion of livestock products in their diet which greatly increases the demand for grain to produce the livestock products. Consumption of livestock products is much more resource demanding because about 11 pounds of grain or grain equivalent livestock feed are required to produce one pound of beef (Table 5). Grain direct for human consumption will tend to decline with increasing incomes compared to livestock products and other products such as fruits and vegetables.

The dynamics of this income and food consumption relationship for a selected number of countries have recently been studied by Rask and are shown in Table 6 and Figure 1. Growth in GNP per capita and food consumption in cereal equivalents per capita between 1966 and 1982 among sixteen countries reveals several interesting results. At low income levels (GNP per capital of about $400 annually) food consumption expenditures consist of about 55 percent on cereals, 30 percent on fruits and vegetables and 15 percent on livestock products while at high income levels (GNP per capita of about $6,000 annually) food consumption expenditures consist of about 55 percent on livestock products, 30 percent on fruits and vegetables and 15 percent on cereals. Several middle income countries such as Taiwan, Korea, The Philippines, and Brazil experienced rapid economic growth and rapid

food consumption growth from 1966 to 1982 while some of the higher income countries such as the U.S. and Canada changed food consumption very little as a result of income growth (Figure 1). Food consumption in cereal equivalents per capita tends to reach a saturation point at higher income levels, causing the proportion spent on food to reach low levels (currently 16 percent of income in the U.S.) while that proportion of income spent on non-food increases rapidly. In addition, at high income levels consumers want more marketing services or conveniences rather than simply more food. This leads to a faster growth in the demand for marketing services than for food.

Grain marketing systems will need to evolve most rapidly in the middle income countries (GNP/capita of $1,000 to $6,000) because the food consumption in cereal equivalents per capita is increasing most dramatically with income growth. As Figure 1 demonstrates, the quantity of grain consumed will be increasing rapidly in these middle income countries so that the amount of grain moved through the marketing system will be increasing rapidly. More efficient physical facilities will be needed and the economics of grain marketing will become more important to producers and consumers. The marketing system will also change because the sources of demand for grain are changing. Livestock feeders, feed manufacturers and industrial processors will emerge as the most important markets for grains rather than retailers selling grains direct for human consumption as the main source of demand. Grain quality and grades and standards will be more important in the marketing system because the livestock feeders and industrial processors will probably emphasize the need for quality products more than intermediaries in the traditional marketing system. As this surge in the demand for grains occurs, countries may also find that

domestic production will need to increase rapidly or else grain imports will increase rapidly to satisfy this demand. If grain imports increase rapidly, large investments will be needed in modern grain handling facilities at ports and interior consumption centers. In the low income countries, the grain marketing system will change more slowly because of the low levels of demand for cereals and slow economic growth rates. Population growth rates and urbanization will likely be more important factors affecting the evolution of the grain marketing system in low income countries. In high income countries where food consumption has leveled off and population growth rates are low, the grain marketing system will also change more slowly.

Income distribution in the growth process can have major impacts on the grain marketing system. If the benefits of economic growth are not evenly distributed among economic classes, the demand for grain and marketing services will lead to very different marketing systems. If income is highly concentrated, a modern system with a broad range of high quality products will probably emerge to serve the needs of a very small percentage of the population, and the traditional system will continue to serve the large majority of the population offering a limited range of low quality products. A modern grain marketing system will probably grow much less rapidly in a country with a highly concentrated income compared to a country with a more equitable distribution of income.

Grain Marketing System Changes

Changes in Grain Market Organization and Performance

Grain market organization and performance have progressed to an improved system in many developing countries during the last twenty years. Further improvements in the organization and performance of grain marketing

systems can and will be made in the next few years as countries experience economic growth. Many changes in grain market organization and performance can already be identified; some of these changes contributed to improved performance and others did not.

As grain markets have grown, the number and size of market participants appears to have also increased, although data on a country by country level to substantiate this is not available to the author. In the traditional marketing system, the number of participants appears to have increased without much change in the size of the operation because of the nature of the traditional labor intensive system from consumer to producer. The fact that it is a very labor intensive system with little capital equipment suggests that few economies of scale are likely to exist within the traditional grain marketing system. One indication of the lack of change in the size of operation of these businesses in the traditional grain marketing system is that these units tend to be owner-operated businesses that are limited to the size that one person can effectively handle with family labor and some hired employees. A large corporate form of organization has not emerged within the traditional grain marketing system of third world countries. Another indication of this relatively stable size of operation is that the vast number of central wholesale markets constructed throughout Latin America and Africa during the last twenty years essentially replicated the same size of grain facility that existed in the traditional system prior to construction of these facilities. Much was accomplished through construction of these wholesale facilities but the size of operation was not significantly changed (Panagides, Larson and Pessoa).

In the modern system, the number and size of participants have probably increased through time. The new technology of supermarkets in combination with better rice and wheat milling equipment as well as food or feed processing equipment have contributed to a larger size of operation. The modern system seems to have captured most of the growth in grain markets due to population and income changes by increasing the number and size of its operations.

The number and type of market transactions have also changed through time because of the increasing importance of the modern marketing system. In the modern system, the supermarkets, flour mills, rice mills and cooperatives have increasingly moved to contracting and vertical integration to improve coordination in supply channels and to reduce the number of transactions between producer and consumer. In the traditional system, the type of transactions (usually spot market prices with intermediary credit) has remained essentially unchanged, while the number of transactions may have actually increased from producer to consumer because of the greater number of participants in this system. Each participant must have a few transactions daily to earn enough money to survive in the subsistence economy.

For a variety of reasons, grain quality and product mix have improved in the last twenty years. The market provides a much wider range of product qualities to satisfy the tastes, preferences and incomes of the consuming population. Rice in Brazil is an example of a situation in which the consumer can choose from a wide variety of rice qualities with different prices and brands. The large supermarkets carry several different brands of rice including their own private label plus those of rice millers and some farmer cooperatives. The introduction and expanding use of grain

grades and standards in many developing countries has contributed to better quality grain products. Better seed varieties, more efficient processing machinery and improved grain storage and handling have contributed to better quality grain products as well.

Governments have made large investments in marketing infrastructure in the form of better roads and highways, railroads, port facilities and storage facilities to reduce transportation and handling costs in the grain marketing system of most developing countries. Some developing countries still have a long way to go in terms of this basic marketing infrastructure so that the opportunity to further reduce transport and handling costs in these countries is large. Bulk handling of grain products may be one of the opportunities to further reduce handling costs in third world countries. The widespread use of handling grain in bags in third world countries suggests that there may be significant barriers to bulk handling of grains in these countries. The economics of bulk handling versus bag handling of grain in different developing countries needs further investigation. Better farm to market roads and even highways between major trading centers could lead to much lower marketing costs for grain. Northeast Brazil, Colombia, Ecuador and Bolivia are but a few examples of countries in which additional improvements in marketing infrastructure are needed. Bolivia has many producing areas isolated from markets because of poor roads that are impassable during much of the year and with very high transportation costs when passable. Cochabamba, a major grain producing area of the country, is linked to the capital city of LaPaz by a very poor road that greatly increases transport costs. It is a time-consuming trip

over a road that is very damaging to trucks and four-wheel drive jeeps. Northeast Brazil and other countries have road conditions similar to that described for Bolivia.

In the last twenty years, the developing countries have invested large amounts of resources in modernizing existing grain storage and handling facilities and building new facilities with all the necessary grain drying, grading and quality control equipment. Although these facilities are owned and operated by some government parastatal marketing organization in most countries, private merchants also own and operate significant amounts of grain storage capacity with all the appropriate equipment. However, governments seem to have decided that grain warehousing is an activity that belongs to the public sector. For the government-owned storage facilities, poor location and management are important reasons for the low rates of utilization of the storage capacity and consequently the relatively high storage costs.

There appears to be relatively little on-farm storage capacity in most countries and what does exist tends to be inadequate for proper grain storage and handling. On-farm storage capacity is limited despite numerous attempts by international organizations to promote and finance on-farm storage facilities. The reasons for a lack of on-farm storage certainly merit further research efforts.

The investments in transport and storage infrastructure plus the improvements in grain handling have all contributed to reduced product losses in grain marketing. Grain marketing losses due to poor transportation methods, grain storage and handling methods and farm harvesting methods were estimated to be very high (15 to 20 percent of production) in many countries during the late 1960s and early 1970s (FAO). Nearly twenty

years later, these losses seem to have been reduced to much lower levels in many developing countries. In modern, commercial, well-equipped grain storage facilities, the losses due to storage and handling are very low; however, losses in rural areas, especially on farms, may still be quite high. There is some evidence that large scale state-owned grain storage facilities have large losses compared to commercial and farm storage because of the differences in management attention to the details of grain storage.

One of the most significant changes in grain markets has been the shift from the high and fluctuating world market prices observed throughout the 1970s to the relatively low and more stable prices of the mid-1980s (Figure 2). Developing countries in Africa, Asia, Latin America and the Near East were able to protect domestic producers and consumers from much of the world market price variability during the 1970s. In these countries, domestic prices tended to lag world prices and also tended to be lower than world prices until 1981. World prices moved downward in 1981 and have declined further since 1983. An important question for grain marketing and for domestic producers and consumers is whether third world countries will attempt to protect their domestic markets from the low prices of the 1980s as they protected their markets from the high prices of the 1970s. The highly profitable prices of the 1970s attracted many resources to grain production in developing countries (Brazil and Argentina, for example) in order to achieve domestic self-sufficiency, reduce dependence on expensive grain imports or to compete on the world market for exports. The return to these resources is declining significantly in the 1980s so that some of the resources will likely exit grain production in

the rest of the 1980s. The rate of exit will depend on the degree of protection that third world countries choose to provide to their grain producers.

Although the evidence on the change in grain marketing margins through time is not available for most developing countries, some limited information across countries at different points in time is presented in Table 7. The price paid to producers as a percentage of the prices paid by consumers for rice, corn and sorghum varies considerably among the countries. For rice, the producer share tends to be highest in the Asian countries and lowest in Africa with Latin America in between these regions. These margins are affected by a number of factors such as the distances between producing and consuming areas, the adequacy of transportation, the services provided and costs of the services, and government policies toward the marketing sector in all these countries. More than anything else, these results show that a large amount of diversity exists among countries for the same commodity and that more information is needed before one could draw firm conclusions about market performance from the margin data of these countries.

Evolution of Grain Marketing Systems

Three parallel marketing systems for grains and other products have emerged in developing countries during the last twenty years. These three systems are: the traditional food marketing system, the modern food marketing system and the institutional food marketing system (Figure 3). Grain products are marketed through all three systems with some significant differences among the three systems because each system tends to serve the needs of a particular clientele best (Riley et al., Slater et al.). The traditional system consists of a large number of small merchants at all

levels of the marketing system and tends to serve the needs of the small farmers and low income consumers who sell or buy in small quantities a lower quality product at the low end of the price range. The small farmers and low income consumers have a large number of transactions and frequently obtain credit from merchants to finance their activities. The modern system consists of a small number of large firms that are integrated horizontally and vertically and tend to serve the needs of large farmers and higher income consumers who buy or sell in larger quantities a better quality product at higher prices. These are self-service operations that provide no consumer credit. Grain farmers in the modern system are more likely to have credit from formal financial institutions, frequently at subsidized rates of interest, than from marketing intermediaries. The institutional system is essentially a public sector marketing system that tries to serve all producers and consumers and generally has not performed well in developing countries because of high operating costs, management inefficiencies, political interference and other reasons.

Three examples of these marketing systems for grain products are shown for rice in northeast Brazil in 1967, corn in Colombia in 1968, and grains in Kenya in the early 1970s (Figures 4, 5 and 6). In each country the modern system was small but making an impact for rice and corn marketing in these countries many years ago. The institutional system was also small and not significant in the Brazil and Colombia marketing systems. The institutional system was much more important in the grain marketing system of Kenya. The traditional system was the dominant force in the grain marketing system of all three countries. If those studies were to be repeated today, the results would very likely show a rapid increase in the importance of the modern system, a stagnating but surviving traditional

system and a more important institutional system. The modern system and to a lesser extent the institutional system have captured most if not all of the growth in grain markets from population and income increases. The supermarkets have become important change agents in these marketing channels and have improved the vertical coordination of the production-distribution system to serve better the consumers and producers (Harrison et al.).

Although the institutional system has grown in importance in grain markets because governments have pumped large amounts of resources into government-owned parastatals, marketing boards and consumer retail stores to help low income consumers and producers, there is a growing dissatisfaction with the results in a number of countries such as Kenya, Brazil, Ecuador, and India (Heyer, Lele, Southworth et al., Larson). They have become large, unmanageable, inefficient and very costly government bureaucracies that have failed to accomplish their stated mission. The costs of intervention in markets have been high while the benefits to producers and consumers may not be that high. Some countries such as Ecuador and Brazil have launched efforts to deregulate markets, reduce government intervention in markets and regain control of government parastatals; however, the results are not final and the number of countries willing to implement such changes may not be large.

The rate of evolution of grain markets depends to a large degree on the rate of economic development of the country. If countries grow rapidly, the dynamics of income and population changes will create an opportunity for rapid change in the grain marketing system. Brazil, Colombia, Korea, Taiwan, and Thailand may be examples of countries where rapid economic growth has led to a rapid evolution of the grain marketing

system. Guyana and Bolivia may be examples of countries where economic stagnation for extended periods of time has adversely affected the development of the grain marketing system. The grain marketing system in these countries has not improved in recent years and may have regressed. Government intervention in grain markets plus macro-economic monetary and fiscal policies have had profound impacts on the economy of these countries and on the performance of the grain marketing system.

The development of commodity exchanges for cash and futures contracts has been an important innovation in grain markets during the last twenty years in developing countries. The establishment of these exchanges has been an important activity to improve the pricing of grain products through an open, competitive market with prices determined by supply and demand. The exchanges represent an effort to move away from a government administered pricing system for grain products to a market determined pricing system. Argentina, Brazil, Colombia, Ecuador and Pakistan are some of the countries that have established commodity exchanges to improve the pricing of grain products. A major problem of most of these exchanges is that the government continues to play a pivotal role in grain trading so that the exchanges are not functioning in a freely competitive market. Diagnostic studies of the pricing efficiency gains (losses) from the introduction of commodity exchanges in third world countries would have important policy implications for many of the countries considering this pricing innovation.

Factors Contributing to Change in Grain Marketing Systems

Rapid economic growth may be the single most important factor contributing to change in grain marketing systems. Brazil, Costa Rica, Taiwan, and South Korea have experienced rapid economic growth since the middle

1960s that also contributed to rapid change in the grain marketing system. Grain production, consumption, and marketing have evolved to better systems in terms of the quantity and quality of product, coordination of supply channels, grain handling and storage methods, number and size of participants, marketing infrastructure, information and other factors. Guyana and Bolivia may be be examples of countries where economic stagnation contributed to little or no economic development or change in the grain marketing system. The most rapid evolution of grain marketing systems seems to occur when GNP per capita surpasses US$400 to US$500 and where the distribution of income is most evenly distributed such as Taiwan. In Brazil, the high concentration of income has slowed the evolution of the grain marketing system, particularly in the northeast of the country. In the south of Brazil where the fruits of economic development are more widely distributed, the grain marketing system has been able to grow and progress more rapidly. Where income is highly concentrated, a dualism tends to exist in the production-distribution system with the small producers and consumers served by traditional, small scale merchants and the large producers and consumers served by the large scale, modern self-service merchants. This dualism is readily apparent in many Latin American developing countries.

Rapid urbanization of developing countries (urban areas growing at a rate of six percent or more annually) forces dramatic changes on the grain marketing system because increasingly large quantities of grain must be moved from the area of production to the urban consuming areas. Large investments in marketing infrastructure and information systems are needed to provide stable supplies of quality products to urban consumers at the lowest possible cost. The more distant are the production areas from the consumption areas, the more complicated becomes the marketing task.

An urban industrial bias in government policy of developing countries affects the nature of the grain marketing system. The government's desire to keep food prices low for urban industrial workers and to hold down the inflation rate may result in food subsidies, retail price controls, over-valued exchange rates and other policies that benefit urban consumers at the expense of rural producers. Retail price controls that hold down consumer food prices benefit urban consumers at the expense of rural producers (Larson). Government subsidies on food are also much more likely to be available to urban consumers than to rural consumers.

Overvalued exchange rates and other trade policies that directly or indirectly tax exports and subsidize imports will benefit urban consumers of food imports while taxing domestic producers of export crops such as grains. With an overvalued exchange rate, the domestic currency costs of an imported commodity are less than what would be the costs at a free market equilibrium exchange rate so the consumers of an imported commodity are subsidized. Producers of an export commodity are taxed because they receive less in terms of domestic currency for exports than they would receive at a free market exchange rate. In Costa Rica, The Dominican Republic and Honduras, for example, overvalued exchange rates in past years have subsidized wheat and coarse grain imports that benefitted local consumers at the expense of local producers. The imported product substitutes for domestic production and consumption of grain products or other close substitutes (Larson and Vogel). Such policies can have major impacts on the grain markets because of the distortions in relative prices introduced by these policies. In addition, the policies may be an important factor determining whether a national grain marketing system developes that is based upon domestic production and consumption or whether a delivery

system for imported grains is developed. The overall costs to domestic grain producers and the marketing system compared with the benefits to domestic consumers needs further analysis in many third world countries.

Government marketing boards and parastatals are widely used in developing countries to regulate the marketing of grain and other products. Typically, these government institutions have a monopoly control of imports and exports, set minimum producer prices, regulate markets with a buffer stock policy, and buy and sell in the domestic market. These boards are major factors in grain marketing and pricing in most countries of Africa and Latin America. Because of their power and resources, the boards can promote the modernization of grain marketing or they can attempt to destroy the incentives to improve the system. Research studies of marketing boards and parastatals by Larson, Lele, Southworth and others have generally found these institutions to be inefficient, non-responsive to consumers and producers, more costly than private sector trading, and very expensive for governments to finance. One should bear in mind, however, that parastatals were promoted because of the belief that one could not depend on private markets to perform certain functions. Market failure may still be a problem in the grain markets of some third world countries. In addition, governments may have political as well as economic objectives for parastatals that influence the performance of these institutions. Careful examination of parastatals and other alternatives on a country by country basis, taking into consideration the economic as well as other political objectives, may be the best way to improve the performance of grain marketing systems.

Better information in cash grain markets has emerged in many developing countries during the last twenty years because of improved communication facilities and government development of daily market information services that are linked to important production and consumption centers. Information on prices, quantities, and qualities is available to improve arbitrage among markets and from one time period to another. Since a few of these market news services have been operating for many years, an evaluation of the costs and benefits of these services might be valuable to international donors and third world countries.

An important factor retarding development of grain markets is the strong negative attitude toward intermediaries in many developing countries. Government policies that typify this attitude are anti-speculation laws that prevent merchants from storing grain and credit restrictions that prevent private merchant access to bank credit. The marketing intermediaries are caught between producers and consumers and fail to satisfy either group. Improved communication between private grain merchants and the government plus a better understanding of marketing functions could weaken this bias and lead to policy changes that improve performance of the grain marketing system.

A Program of Research and Technical Assistance in Grain Marketing

A program of applied research and technical assistance in grain marketing should include the following components: (1) applied research that focuses on important issues in grain marketing in several countries over a four to five year period, (2) technical assistance to AID missions and host country governments that may be of a short and long term natures, (3) graduate degree and non-degree training of U.S. nationals and foreign nationals in grain marketing, and (4) information exchange of research

results and implementation activities through workshops and periodic newsletters sent to interested researchers, policy makers and international donors.

The applied research component of the program should be problem oriented, diagnostic and prescriptive in nature. The objective of the research would be to assist missions and host governments to improve the performance of the grain marketing system. An important part of the applied research would be a policy dialogue among AID missions, researchers and host countries regarding marketing problems, research results and policy options to improve performance. Another dimension of the applied research component would be case studies of marketing innovation success stories in various countries that could be prepared in a short period of time for possible use in other countries and missions. It will be useful to differentiate two types of research. One involves technical problems of grain marketing that influence costs and productivity and the other involves the institutions of the market and related policies. The technical problems address the functions of storage, transportation, processing, retailing, grading, financing, risk bearing, etc. The second type of research addresses the market institutions such as pricing institutions, parastatals, marketing boards, taxes, tariffs, subsidies, market regulations, coordinating mechanisms, etc. All these have a profound impact on market performance. Changes that reduce costs and improve quality have the potential for increasing the real income of producers and consumers and contributing to economic development of the country.

Some examples of the more important applied research issues that need to be examined are as follows. Additional issues have been identified in earlier sections of this paper.

The costs and benefits to producers and consumers of the wide array of government policy instruments such as price and margin controls, exchange rates and other taxes and subsidies that are used to intervene in grain markets need to be evaluated. Price stabilization and buffer stock policies that are implemented through government parastatals and marketing boards have been very costly to developing country governments and frequently have failed to accomplish the government's food policy objectives. The cost effectiveness of these activities needs to be examined more carefully to determine whether the objectives can be accomplished more cheaply with the current institutions or whether some other alternative can accomplish the objectives at lower cost.

Better market information, especially outlook information, is needed by developing countries so that they can estimate more accurately grain production and utilization and formulate correct policies toward imports and/or exports of grains for their country. To be effective, this must be forward looking information and not historical information. The numerous examples of incorrect decisions to import and export grain based on inadequate production and utilization data in third world countries could be avoided with reliable and timely outlook information. Such incorrect decisions have usually been very costly to these countries.

Additional work is needed on uniform grain grades and standards in most third world countries so that value of products to the end user can be more accurately reflected through prices back to the grain producer. This would improve resource allocation decisions of producers and consumers and lower cost through commodity trading by grades and contracts rather than personal inspection of each lot for sale.

Ways to improve small farmer grain marketing are still needed. The local country and foreign assistance efforts to help small farmers market their products have usually turned out to be more expensive than the traditional grain marketing system. The link between marketing and credit especially for small farmers has never been thoroughly studied and analyzed in developing countries to determine the economic costs and benefits of this relationship between intermediary and small farmer.

The modern marketing system has found ways to improve coordination in supply channels through vertical integration and contracting. New ways to improve coordination in the supply channels of the traditional system are needed to enhance its long-term viability in grain markets. In a few countries farmer cooperatives have been a means to improve performance of the traditional system. Case studies of the reasons for these success stores need to be completed and disseminated.

Information to document the evolution of grain marketing systems in developing countries is quite limited. Temporal and cross section studies of grain marketing systems are needed to clarify the understanding of the evolution and performance of these systems and their contribution to the ecomomic development of third world countries.

The technical assistance component would utilize researchers and consultants to provide short term technical assistance to AID missions and host countries on grain marketing problems. The technical assistance would draw upon the on-going applied research results discussed above to assist in the solution to these problems. Where appropriate, long term technical assistance would also be available to missions and host countries. A roster of researchers and consultants by area of expertise, availability, language capability, experience, etc. should also be developed as part of

this component. Holtzman's rapid reconnaissance guidelines for agricultural marketing research will be especially useful for these short term assignments.

The training component would include graduate degree and non-degree training of U.S. nationals and foreign nationals in grain marketing. People trained in marketing are needed to conduct research on marketing problems, to work in private and public sector marketing firms, to advise government policy makers on marketing problems and to train public and private sector intermediaries in marketing and management. People trained in agricultural marketing in developing countries seem to be in short supply today. Many centers and programs in third world countries that trained people in practical non-degree marketing programs 10 to 15 years ago are no longer training people today. Financial support for graduate degree training of foreign nationals and U.S. nationals also seems much more limited today than 10 to 15 years ago.

The last component of the grain marketing program is an information exchange system. This would include workshops in third world countries where decision makers, international donors, marketing intermediaries and researchers would discuss marketing problems, research results and alternative solutions to those problems. A periodic newsletter that presents abstracts of research results and examples of successful implementation activities would also be a part of this component. The newsletter would be sent to all interested decision makers, researchers, and international donors.

Table 1: Combined World Supplies, Utilization, Trade and Stocks of All Grains in 1985-86, Projections for 1986-87 and Comparisons with Selected Recent Years in Millions of Metric Tons

July-June Trade Years	Production	Utilization	Total Trade	Ending Stocks[a/]	Stocks as % of Utilization
Projected					
1986-87	1,643	1,615	194	348	21.6
Preliminary					
1985-86	1,662	1,584	194	320	20.2
1984-85	1,643	1,594	219	242	15.2
1983-84	1,482	1,554	208	181	11.6
1982-83	1,544	1,511	201	252	16.7
1981-82	1,498	1,462	210	219	15.0
1980-81	1,446	1,460	215	183	12.6
1979-80	1,423	1,447	198	197	13.6
1978-79	1,462	1,435	177	221	15.5
1976-77	1,362	1,308	158	196	15.0
1971-72	1,197	1,179	110	183	15.6
1966-67	1,007	981	104	169	17.2

a/ Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

Source: U.S. Department of Agriculture, Foreign Agricultural Service Foreign Agriculture Circular, Grains, FG 10-85 (Washington, D.C.), July 1985. Includes wheat, milled rice, and coarse grains.

Table 2: World Wheat Production, Utilization, Trade, and Carryover Stocks in Millions of Metric Tons in 1985-86 and Selected Recent Years

July-June Trade Years	Production	Utilization	Total Trade	Ending Stocks [a/]	Stocks as % of Utilization
Projected					
1986-87	504.0	503.1	91.5	125.3	24.9
Preliminary					
1985-86	502.4	494.4	85.5	124.4	25.2
1984-85	515.6	500.2	106.9	116.4	23.3
1983-84	490.4	488.4	102.9	98.5	20.2
1982-83	479.1	467/8	98.6	96.4	20.6
1981-82	448.4	441.5	101.3	85.1	19.3
1980-81	442.7	445.6	94.1	78.2	17.5
1979-80	424.4	444.2	86.0	81.0	18.4
1978-79	446.8	430.2	72.0	100.9	23.9
1976-77	421.3	385.8	63.3	99.8	26.2
1971-72	350.9	344.2	52.00	81.0	23.5
1966-67	306.8	279.9	56.0	82.1	29.4

[a/] Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, Foreign Agricultural Circular, Grains, FG-10-85 (Washington, D.C.), July 1985. Includes wheat and wheat products.

Table 3 : World Coarse Grain Production, Utilization, Trade, and Carryover Stocks in Millions of Metric Tons in 1985-86 and Selected Recent Years

July-June Trade Years	Production	Utilization	Total Trade	Ending Stocks [a]	Stocks as % of Utilization
Projected					
1986-87	818.2	790.5	90.2	199.5	25.2
Preliminary					
1985-86	843.1	775.1	83.0	171.8	22.2
1984-85	809.3	780.1	101.0	103.7	13.3
1983-84	685.1	758.7	92.5	65.1	8.6
1982-83	778.8	753.0	90.2	138.7	18.4
1981-82	768.8	738.6	96.6	113.0	15.3
1980-81	732.0	742.1	108.8	82.8	11.2
1979-80	740.6	740.0	99.2	92.7	12.5
1978-79	751.7	746.0	92.7	92.2	12.4
1976-77	703.5	684.2	83.9	78.2	11.4
1971-72	629.9	616.2	49.3	87.0	14.1
1966-67	521.2	520.2	40.0	76.1	14.6

[a] Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, Foreign Agricultural Circular, Grains. (Washington, D.C.), FG 10-85 1985; FG 6-85, April 1985.

Table 4: World Milled Rice
Production, Utilization, Trade and Carryover Stocks in
Millions of Metric Tons in 1985-86 and Selected Recent Years

July-June Trade Years	Production	Utilization	Total Trade[a/]	Ending Stocks[b/]	Stocks as % of Utilization
Projected					
1986-87	320.6	321.4	11.9	23.3	7.2
Preliminary					
1985-86	316.3	314.0	12.3	24.0	7.7
1984-85	318.3	313.8	11.5	21.7	6.9
1983-84	307.1	307.4	12.5	16.9	5.4
1982-83	285.5	289.5	11.9	17.3	6.0
1981-82	280.6	281.4	11.6	21.3	7.6
1980-81	271.0	272.3	13.1	22.1	8.1
1979-80	258.1	262.6	12.7	23.3	8.9
1978-79	263.7	258.6	12.0	27.8	10.8
1976-77	236.8	238.4	10.6	17.7	7.4
1971-72	216.4	218.8	8.7	15.3	7.0
1966-67	179.3	180.7	7.8	10.6	5.9

a/ Exports are computed on a calendar year basis.

b/ Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

Source: U.S. Department of Agriculture, Foreign Agriculture Service, Foreign Agricultural Circular, Grains, (Washington, D.C.), FG 9-84 June 1984; FG 10-85, July 1985.

Table 5: **Cereal Equivalent Conversion Factors**

Commodity	Conversion Factor
Plant Products[1/]	
Cereals	1.0
Pulses	1.0
Roots and tubers	0.2
Fruits and Vegetables	0.2
Oil Seeds	1.2
Raw Sugar	1.1
Tree Nuts	1.0
Livestock Products[2/]	
Beef, veal, lamb and goat	11.0
Pork	4.3
Chicken, turkey, ducks and geese	2.3
Eggs	4.4
Milk products	0.6

1/ Adapted from Gilland

2/ Estimated based on USDA Livestock-Feed Relationships

Source: Rask

Table 6: Per Capita GNP and Annual Per Capital Food Consumption in Cereal Equivalents for Selected Countries, 1966 and 1982

Country	GNP/Capital 1966	GNP/Capital 1982	Food Consumption in Cereal Equivalents/Capita[1] 1966	Food Consumption in Cereal Equivalents/Capita[1] 1982
	- - $ 1985 - -		- - - Metric Tons - - -	
Lower Middle Income				
Pakistan	$373	$410	.31	.38
Philippines	574	873	.39	.51
Nigeria	298	960	.30	.27
Upper Middle Income				
Turkey	900	1,460	.95	.95
S. Korea	390	2,070	.38	.63
Brazil	964	2,340	.80	1.03
Taiwan	1,200	3,000	.47	.96
Mexico	1,447	3,146	.66	.80
Yugoslavia	1,032	3,627	1.06	1.50
Greece	2,269	4,636	1.18	1.45
High Income				
Italy	3,802	7,380	1.28	1.56
Japan	3,052	10,900	.61	.79
Canada	8,249	12,600	2.22	2.12
France	6,341	12,780	1.91	2.25
West Germany	5,924	13,390	1.57	1.80
United States	11,200	14,200	2.10	2.20

[1] See Table 1

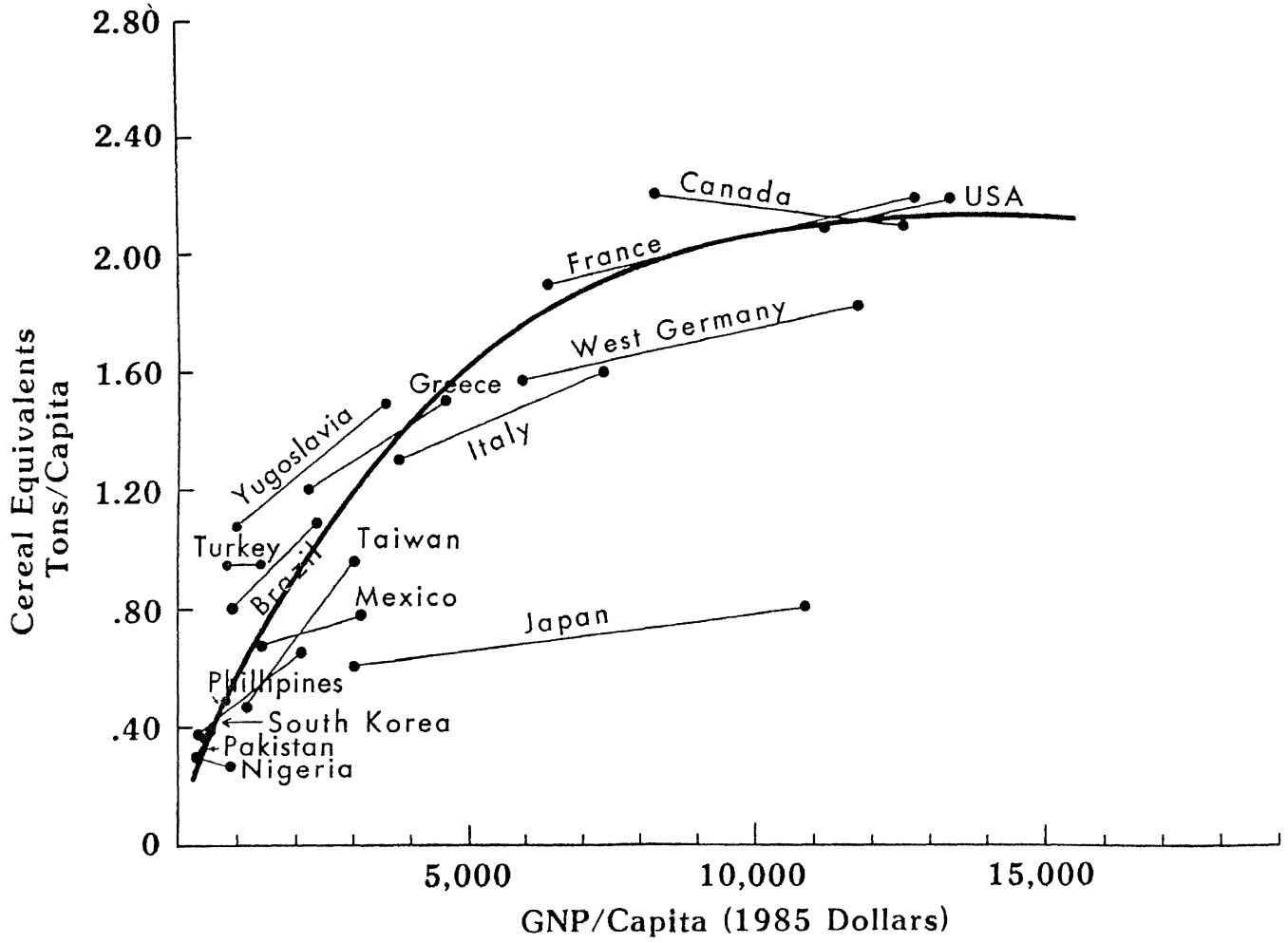
Source: Rask

Table 7: Prices to Producers as a Percentage of Prices Paid By Consumers in Selected Countries (1970-1980)

Rice	Corn	Sorghum
	- - - - - - - Percent - - - - - - -	
Malawi 55	Tanzania 38	Tanzania 38
Tanzania 57	Kenya 57	Nigeria 60
Nigeria 57	Malawi 48	Sudan 61
Bangladesh 79	Nigeria 55	India 80
India 82	Philippines 72	
Indonesia 84	Colombia 70	
Taiwan 66	Costa Rica 60	
The Philippines 87		
Colombia 70		
Costa Rica 60		
Brazil 63		
Africa 52		
Asia 79		
Latin America 64		

Source: FAO Conference on Food and Agriculture, August 1985, and other marketing studies for Taiwan, Brazil, Colombia and Costa Rica

Figure 1: Food Consumption and Income 1966-82



Source. Rask

Figure 2: Real Farm Prices of Cereals and Retail Food Prices in Africa, Asia, Latin America and Near East, 1967-83

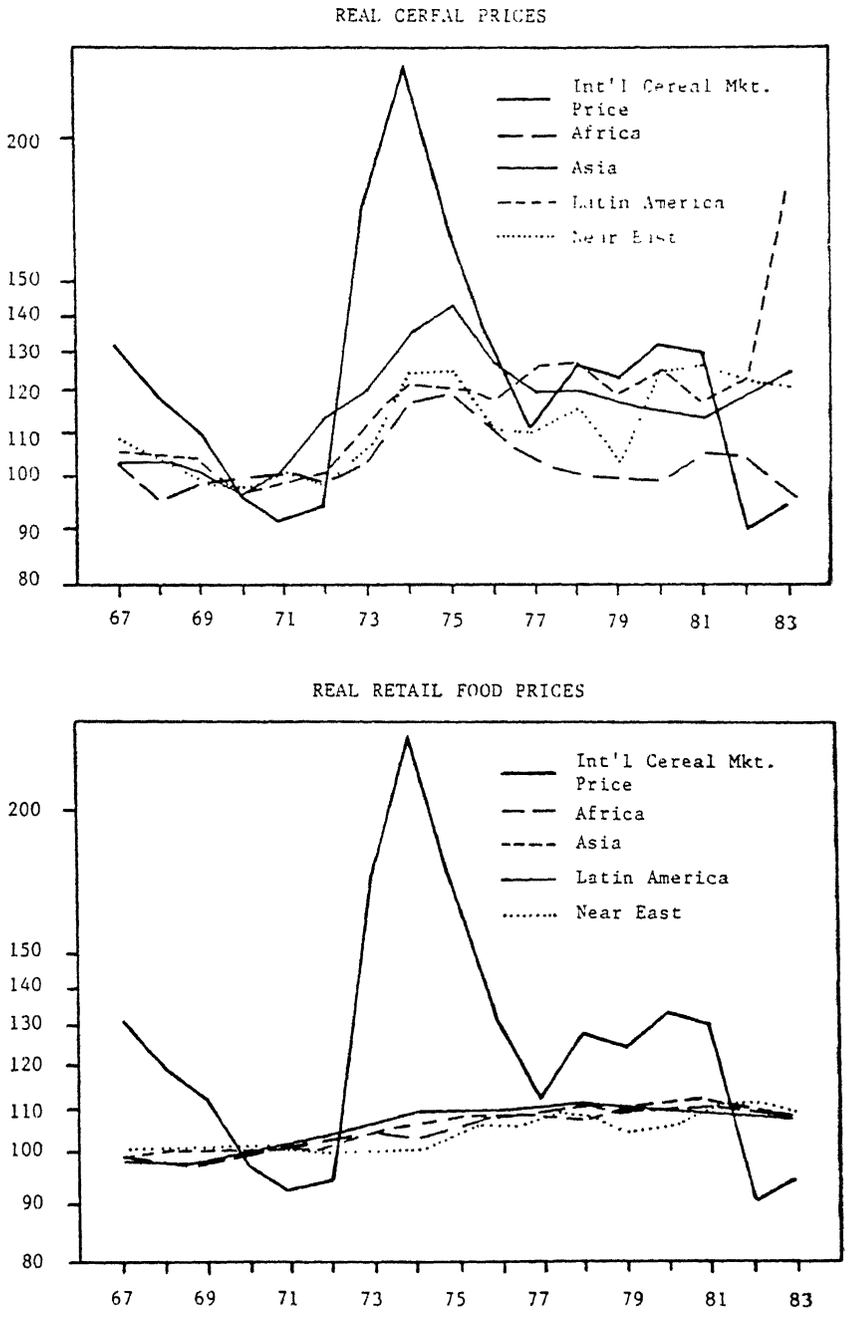
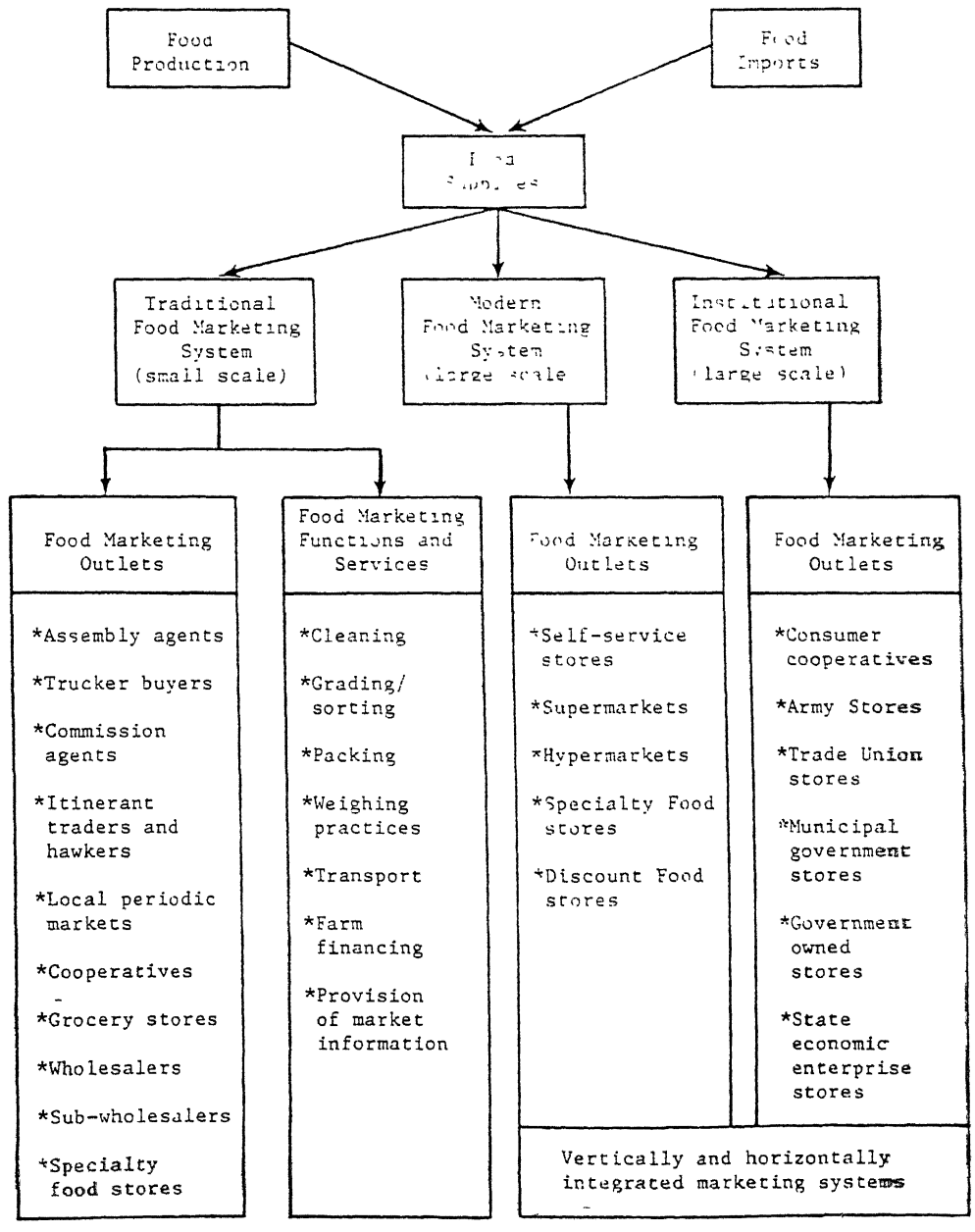


Figure 3: World Food Marketing Systems



Source: Kaynak

Figure 4: Rice Marketing Channel in Northeast, Brazil, 1967

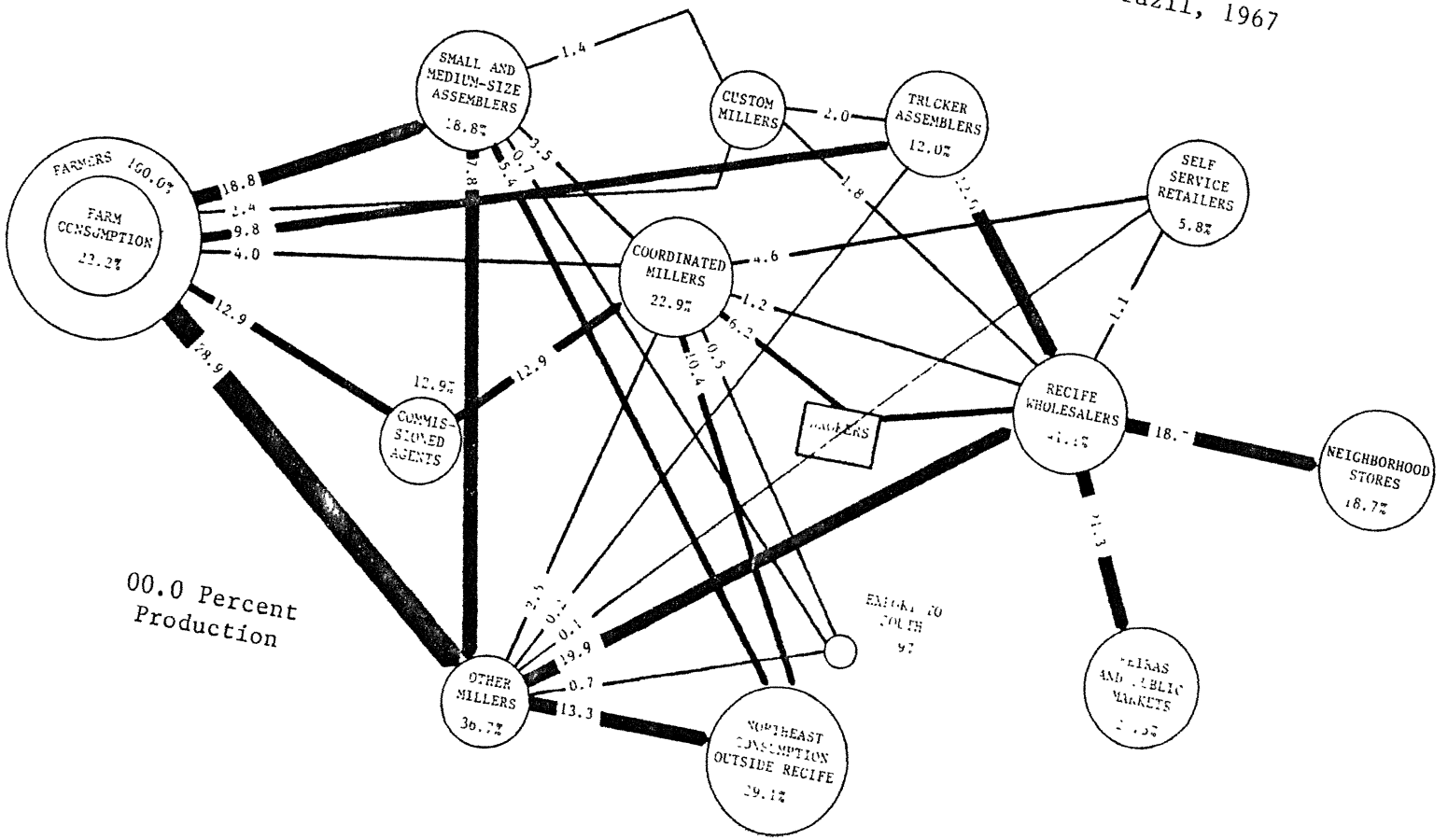
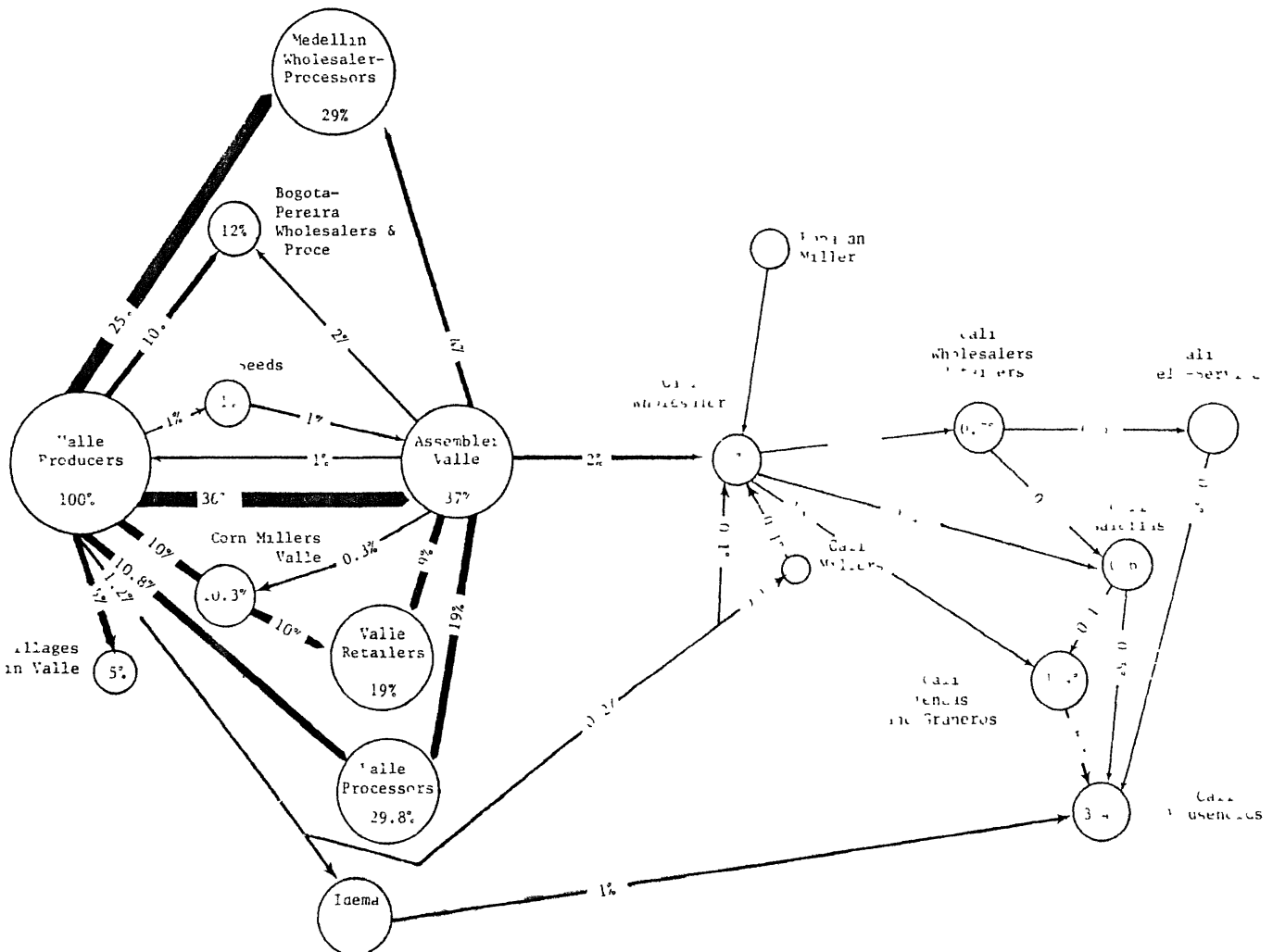
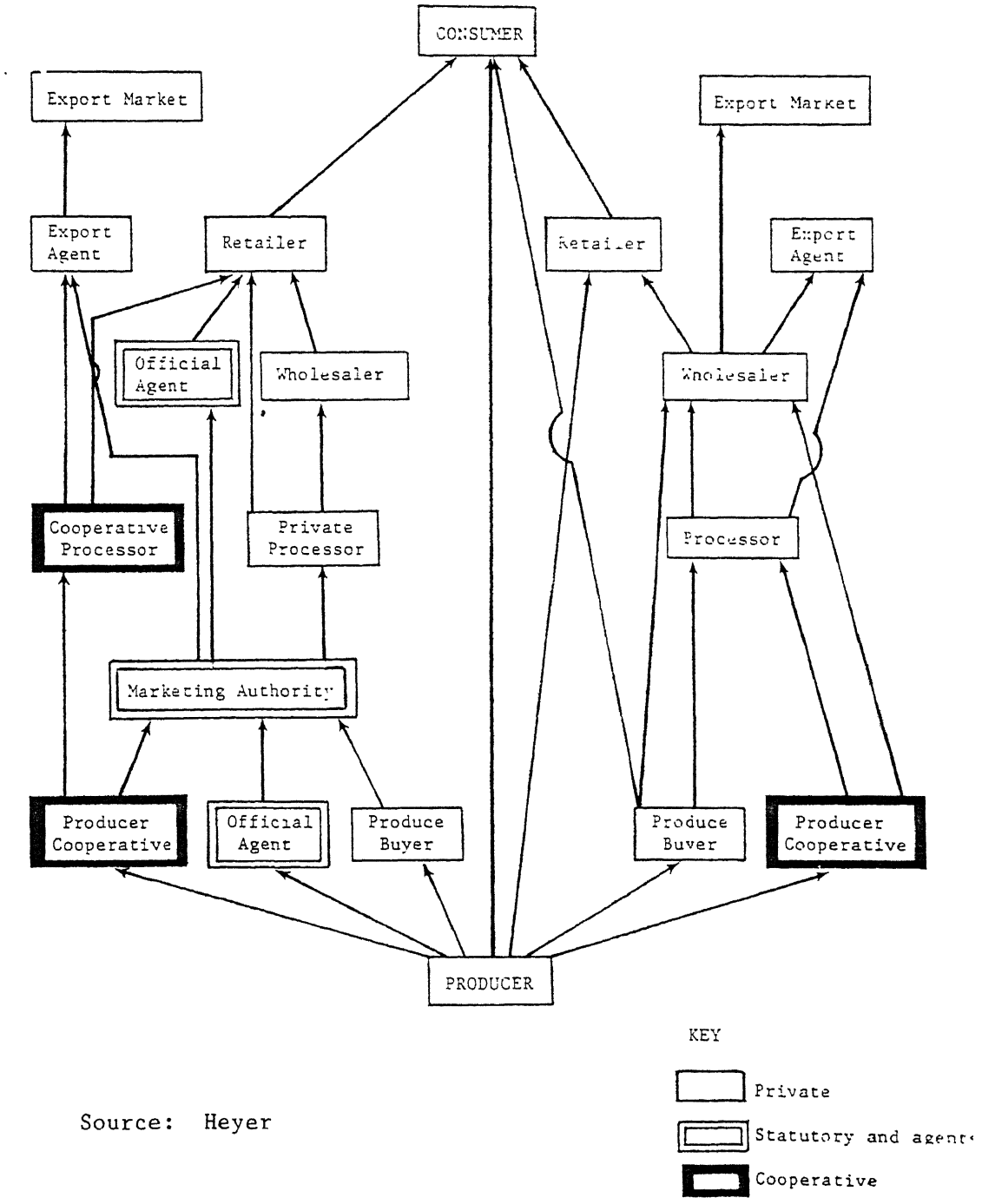


Figure 5: Corn Marketing Channel in Cauca Valley, Colombia, 1968



Source: Riley et. al.



Source: Heyer

Figure 6: Marketing Chains in Kenya

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